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(54) Title: **NANO-SIZED OPTICAL FLUORESCENCE LABELS AND USES THEREOF**

(57) Abstract: A composition is disclosed which is capable of being used for detection, comprising an encapsulated noble metal nanocluster. Methods for preparing the encapsulated noble metal nanoclusters, and methods of using the encapsulated noble metal nanoclusters are also disclosed. The noble metal nanoclusters are preferably encapsulated by a dendrimer or a peptide. The encapsulated noble metal nanoclusters have a characteristic spectral emission, wherein said spectral emission is varied by controlling the nature of the encapsulating material, such as by controlling the size of the nanocluster and/or the generation of the dendrimer, and wherein said emission is used to provide information about a biological state.

WO 2004/003558 A1